Kramer Electronics, Ltd.

USER MANUAL

Models:

PT-110, ***XGA Line Transmitter***

WP-110, ***XGA Line Transmitter***

PT-120, ***XGA Line Receiver***

TP-120, ***XGA Line Receiver***

Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
3	**Overview**	**2**
3.1	PT-110 XGA Line Transmitter	2
3.2	WP-110 XGA Line Transmitter	2
3.3	PT-120 XGA Line Receiver	3
3.4	TP-120 XGA Line Receiver	3
3.5	About the Power Connect Feature	3
3.6	Shielded Twisted Pair (STP) / Unshielded Twisted Pair (UTP)	4
3.7	Achieving the Best Performance	4
4	**Your XGA Line Transmitter(s) / Receiver**	**5**
4.1	Your PT-110 XGA Line Transmitter	5
4.2	Your WP-110 XGA Line Transmitter	6
4.3	Your PT-120 XGA Line Receiver	7
4.4	Your TP-120 XGA Line Receiver	8
5	**Using the XGA Line Transmitter(s) / Receiver**	**10**
5.1	Installing the WP-110 XGA Line Transmitter	11
5.2	Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors	12
6	**Technical Specifications**	**13**

Figures

Figure 1: PT-110 XGA Line Transmitter 5
Figure 2: WP-110 XGA Line Transmitter 6
Figure 3: PT-120 XGA Line Receiver 7
Figure 4: TP-120 XGA Line Receiver 8
Figure 5: TP-120 XGA Line Receiver (Underside) 9
Figure 6: XGA-to-Twisted Pair Transmitter and Receiver System via UTP Cable 11
Figure 7: CAT 5 PINOUT 12

Tables

Table 1: PT-110 Features 5
Table 2: WP-110 XGA Line Transmitter Features 7
Table 3: PT-120 XGA Line Receiver Features 8
Table 4: TP-120 XGA Line Receiver Features 9
Table 5: TP-120 XGA Line Receiver (Underside) Features 9
Table 6: CAT 5 PINOUT 12
Table 7: Technical Specifications of the PT-110 / WP-110 / PT-120 / TP-120 13

1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in eight groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer Pico TOOLS **PT-110** *XGA Line Transmitter*, Kramer Wall Plate **WP-110** *XGA Line Transmitter*, Kramer Pico TOOLS **PT-120** *XGA Line Receiver*, and/or Kramer TOOLS **TP-120** *XGA Line Receiver*, which are ideal for:

- Presentation and multimedia applications
- Long range graphics distribution for schools, hospitals, security, and stores

The package includes the following items:

- **PT-110** *XGA Line Transmitter* or **WP-110** *XGA Line Transmitter* or **PT-120** *XGA Line Receiver* or **TP-120** *XGA Line Receiver*
- Power adapter (12V DC Input) and this user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high-resolution cables[3]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

3 Overview

This section describes:

- A summary of the **PT-110** *XGA Line Transmitter*, see section 3.1
- A summary of the **WP-110** *XGA Line Transmitter*, see section 3.2
- A summary of the **PT-120** *XGA Line Receiver*, see section 3.3
- A summary of the **TP-120** *XGA Line Receiver*, see section 3.4
- The power connect feature, see section 3.5
- Using shielded twisted pair (STP) / unshielded twisted pair (UTP), see section 3.6
- Recommendations for achieving the best performance, see section 3.7

3.1 PT-110 XGA Line Transmitter

Using a XGA Line Transmitter—the **PT-110** or **WP-110**—with the **PT-120** or **TP-120** constitutes a VGA/XGA-to-Twisted Pair Transmitter and Receiver.

The Kramer Pico TOOLS **PT-110** is an XGA line transmitter that receives an XGA signal and transmits it over a CAT 5 cable to the **PT-120** or **TP-120** receiver. In particular, the **PT-110**:

- Has a resolution of up to UXGA
- Can use the simplest UTP CAT 5 cables, and performs even better with higher quality cables
- Has the power connect feature[1]
- Is 12VDC fed

3.2 WP-110 XGA Line Transmitter

The Kramer Wall Plate **WP-110** is an XGA line transmitter—available in three versions: one for the USA, one for Belgium and Germany, and one for the UK and most of Europe[2]—that receives an XGA signal and transmits it over a CAT 5 cable to the **PT-120** or **TP-120** receiver. In particular, the **WP-110**:

- Has a resolution of up to UXGA
- Can use the simplest UTP CAT 5 cables, however, it benefits

1 Powering via the CAT5 cable from either the receiver or the transmitter is good for 100 meters. Above it, both sides should be fed with power

2 Excluding Belgium and Germany

from better quality cables

- Has the power connect feature[1]
- Is powered via a standard 12 Volt DC feed

3.3 PT-120 XGA Line Receiver

The Kramer Pico TOOLS **PT-120** is an XGA line receiver that receives a coded CAT 5 signal transmitted by either the **WP-110** or the **PT-110**, decodes it and converts it to an XGA output. In particular, the **PT-120**:

- Has an operating range of more than 300 ft. (more than 100 meters) using standard CAT 5 cable and the **WP-110** or the **PT-110**
- Includes EQ. and level controls
- Has the power connect feature[1]
- Is 12V DC fed

3.4 TP-120 XGA Line Receiver

The Kramer TOOLS **TP-120** is an XGA line receiver that receives a coded CAT 5 signal transmitted by either the **WP-110** or the **PT-110**, decodes it and converts it to an XGA output. In particular, the **TP-120**:

- Has an operating range of more than 300 ft. (more than 100 meters) using standard CAT 5 cable and the **WP-110** or the **PT-110**
- Includes EQ. and level controls
- Has the power connect feature[2]
- Is 12V DC fed

3.5 About the Power Connect Feature

The Power Connect feature applies as long as the cable can carry power. The distance does not exceed 50 meters on standard CAT 5 cable, for longer distances, heavy gauge cable should be used[3].

For a CAT 5 cable exceeding a distance of 50 meters, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

1 Powering via the CAT5 cable from either the receiver or the transmitter is good for 60 meters. Above it, both sides should be fed with power

2 Powering via the CAT5 cable from either the receiver or the transmitter is good for 100 meters. Above it, both sides should be fed with power

3 CAT5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

3.6 Shielded Twisted Pair (STP) / Unshielded Twisted Pair (UTP)

The decision whether to use shielded twisted pair (STP) cable or unshielded twisted pair (UTP) cable depends on the nature of the application.

It is recommended that in applications with high interference, shielded twisted pair (STP) cable will give better results. However, the shield itself does create a capacitance that degrades the frequency response of the machines. For shorter distances, of 50m or so, shielded twisted pair (STP) cable is preferred because it provides protection from interference (degradation is non-apparent).

For a long-range application, unshielded twisted pair (UTP) cable is preferred. However, the unshielded twisted pair (UTP) cable should be installed far away from electric cables, motors etc., which are prone to create electrical interference.

It is recommended to use shielded twisted pair (STP) skew-free Kramer cable **BC-SXTP** for transmitting VGA signals, and shielded twisted pair (STP) non-skew-free Kramer **BC-STP** cable for digital signals.

3.7 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low-quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer *XGA Line Transmitter(s) / Receiver* away from moisture, excessive sunlight and dust

Caution – No operator-serviceable parts inside unit.

Warning – Use only the Kramer Electronics input power wall adapter that is provided with this unit[2].

Warning – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

2 For example: model number AD2512C, part number 2535-000251

4 Your XGA Line Transmitter(s) / Receiver

This section defines the XGA Line Transmitter(s) / Receiver:

- **PT-110** XGA Line Transmitter (see section 4.1)
- **WP-110** XGA Line Transmitter (see section 4.2)
- **PT-120** XGA Line Receiver (see section 4.3)
- **TP-120** XGA Line Receiver (see section 4.4)

4.1 Your PT-110 XGA Line Transmitter

Figure 1 and *Table 1* define the **PT-110**:

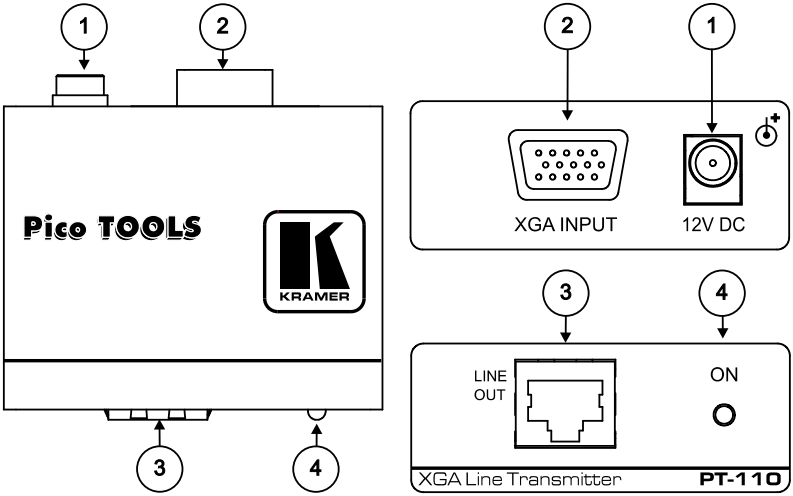


Figure 1: PT-110 XGA Line Transmitter

Table 1: PT-110 Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*XGA INPUT* HD15F Connector	Connect to the XGA source
3	*LINE OUT* RJ-45 Connector	Connects to the *LINE IN* RJ-45 connector on the **PT-120** or **TP-120** *XGA Line Receiver*[1]
4	*ON* LED	Illuminates when receiving power

1 Using a UTP cable with CAT 5 connectors at both ends (the PINOUT is defined in *Table 6* and *Figure 7*)

4.2 Your WP-110 XGA Line Transmitter

The **WP-110** is available in three versions: one for the US, one for Belgium and Germany, and one for the UK and most of Europe[1], as *Figure 2* and *Table 2* define:

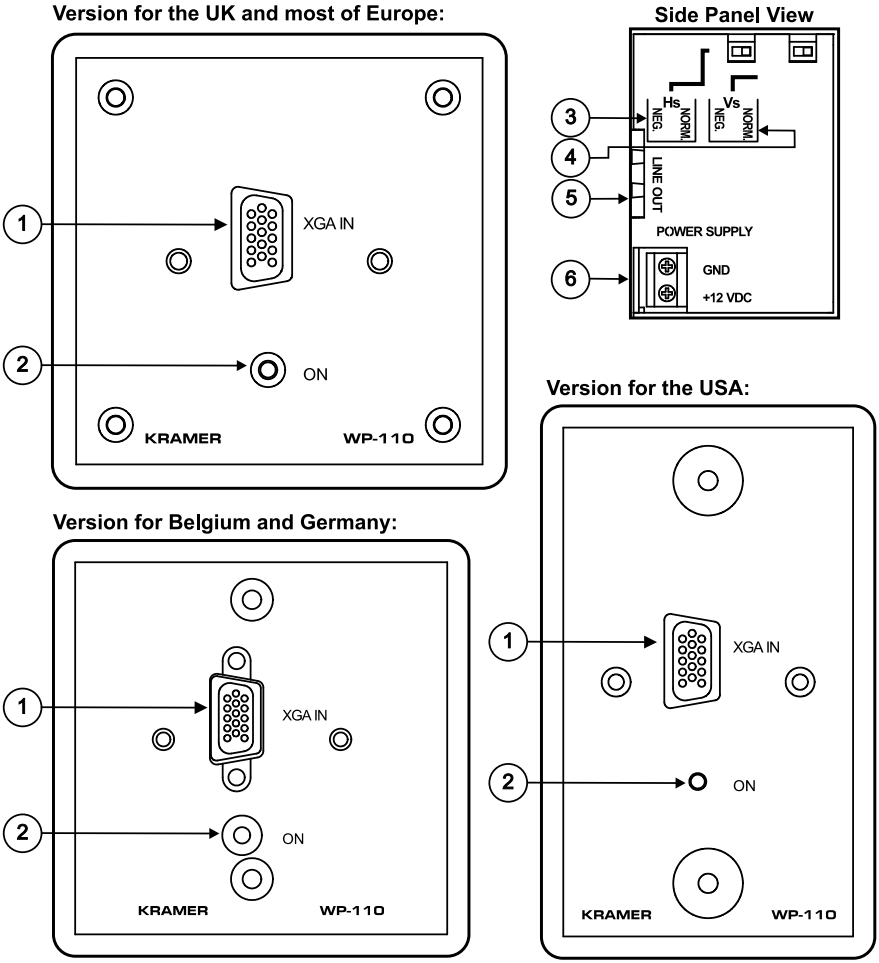


Figure 2: WP-110 XGA Line Transmitter

1 Excluding Belgium and Germany

Table 2: WP-110 XGA Line Transmitter Features

#	Feature		Function
1	*XGA IN* HD15F Connector		Connect to the XGA source
2	*ON* LED		Illuminates when receiving power
3	*HS*[3] Switch		Slide the switch to the left[1] to change the HS polarity to (NEG.) negative polarity[2]; slide the switch to the right (NORM.) to retain the polarity
4	*VS*[3] Switch		Slide the switch to the left[1] to change the VS polarity to (NEG.) negative polarity[2]; slide the switch to the right (NORM.) to retain the polarity
5	*LINE OUT* RJ-45 Connector		Connects to the *LINE IN* RJ-45 connector on the **PT-120** or **TP-120** *XGA Line Receiver*[4]
6	*POWER SUPPLY*	GND PIN	Connect (-) to the Ground
		+12 VDC PIN	Connect (+) to the connector for powering the unit

4.3 Your PT-120 XGA Line Receiver

This section describes the **PT-120** *XGA Line Receiver*

Figure 3 and *Table 3* define the topside of the **PT-120** *XGA Line Receiver*:

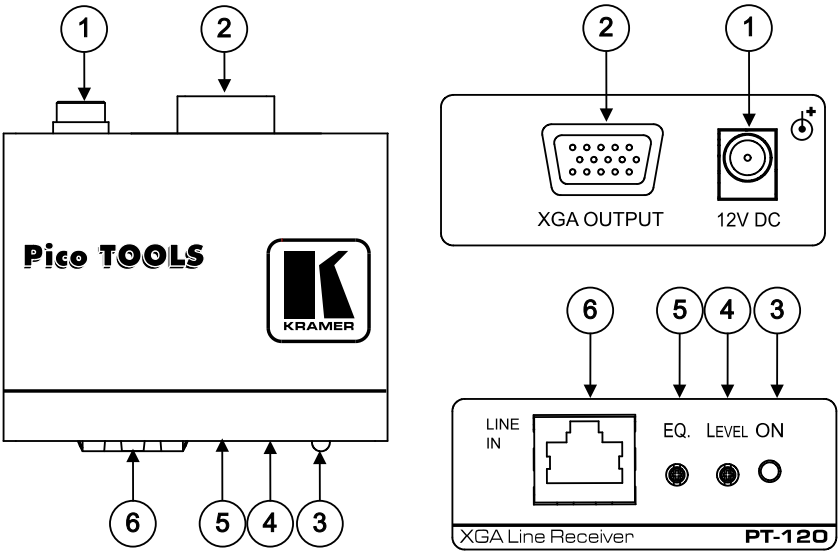


Figure 3: PT-120 XGA Line Receiver

1 By default, both switches are set to the right

2 Downgoing syncs

3 SYNC

4 Using a UTP cable with CAT 5 connectors at both ends (the PINOUT is defined in *Table 8* and *Figure 9*)

Table 3: PT-120 XGA Line Receiver Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*XGA OUTPUT* HD15F Connector	Connect to the XGA acceptor
3	*ON* LED	Illuminates when receiving power
4	*LEVEL* Trimmer	Adjusts[1] the output signal level
5	*EQ.*[2] Trimmer	Adjusts[2] the cable compensation equalization level
6	*LINE IN* RJ-45 Connector	Connects to the *LINE OUT* RJ-45 connector on the **PT-110** or **WP-110** *XGA Line Receiver*[3]

4.4 Your TP-120 XGA Line Receiver

This section describes the **TP-120** *XGA Line Receiver* and its underside. *Figure 4* and *Table 4* define the topside of the **TP-120** *XGA Line Receiver*:

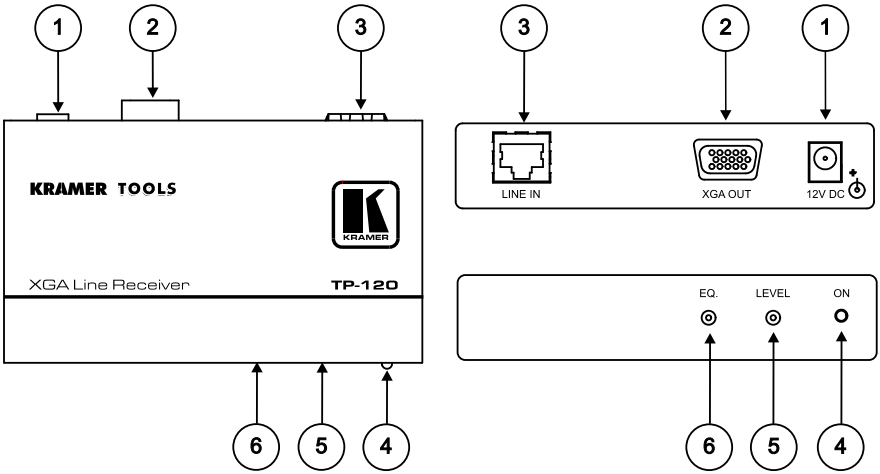


Figure 4: TP-120 XGA Line Receiver

1 Use a screwdriver to carefully rotate the trimmer, adjusting the appropriate level

2 Degradation and VGA/XGA signal loss can result from using long cables (due to stray capacitance), sometimes leading to a total loss of sharpness in high-resolution signals

3 Using a UTP cable with CAT 5 connectors at both ends (the PINOUT is defined in *Table 6* and *Figure 7*)

Table 4: TP-120 XGA Line Receiver Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*XGA OUT* HD15F Connector	Connect to the XGA acceptor
3	*LINE IN* RJ-45 Connector	Connects to the *LINE OUT* RJ-45 connector on the **PT-110** or **WP-110** *XGA Line Receiver*[1]
4	*ON* LED	Illuminates when receiving power
5	*LEVEL* Trimmer	Adjusts[2] the output signal level
6	*EQ.*[3] Trimmer	Adjusts[2] the cable compensation equalization level

Figure 5 and *Table 5* define the underside of the **TP-120** *XGA Line Receiver*:

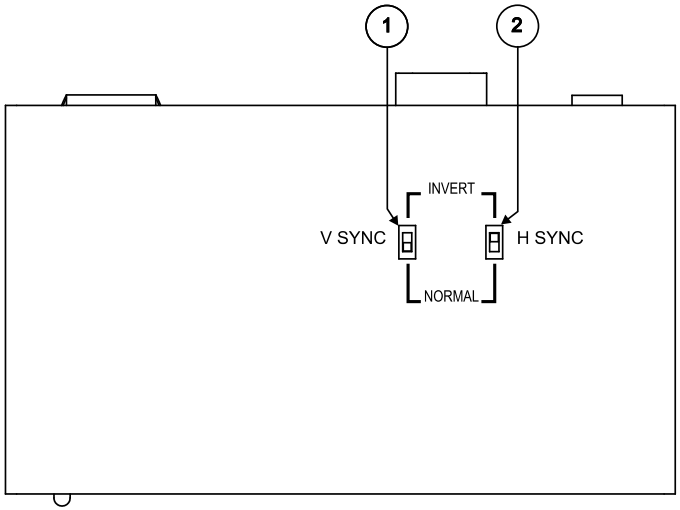


Figure 5: TP-120 XGA Line Receiver (Underside)

Table 5: TP-120 XGA Line Receiver (Underside) Features

#	Feature	Function
1	*H SYNC* Switch	Slide the switch up[4] to change the H SYNC polarity; slide the switch down to retain the polarity
2	*V SYNC* Switch	Slide the switch up[4] to change the V SYNC polarity; slide the switch down to retain the polarity

1 Using a UTP cable with CAT 5 connectors at both ends (the PINOUT is defined in *Table 6* and *Figure 7*)

2 Use a screwdriver to carefully rotate the trimmer, adjusting the appropriate level

3 Degradation and VGA/XGA signal loss can result from using long cables (due to stray capacitance), sometimes leading to a total loss of sharpness in high-resolution signals

4 By default, both switches are set down for normal V SYNC and H SYNC polarity

5 Using the XGA Line Transmitter(s) / Receiver

You can use the **PT-110**[1] *XGA Line Transmitter* and the **TP-120** *XGA Line Receiver* to configure an XGA-to-Twisted Pair Transmitter and Receiver system.

To connect the **PT-110** *XGA Line Transmitter* with the **TP-120** *XGA Line Receiver*, as the example in *Figure 6* illustrates, do the following:

1. On the **PT-110**, connect the XGA source (for example, the HD-15 output from a computer's graphics card) to the XGA INPUT HD15F connector.
2. On the **TP-120**, connect the XGA OUT HD15F connector to the XGA acceptor (for example, a monitor).
3. Connect the LINE OUTPUT RJ-45 connector on the **PT-110** to the LINE IN RJ-45 connector on the **TP-120**, via UTP cabling (with a range of more than 300ft (>100m)).
4. On both[2] the **PT-110** and the **TP-120**, connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity.
   The signal from the XGA source is transmitted via CAT 5 cable, decoded and converted at the XGA OUT HD15F connector to the XGA acceptor.
5. On the **TP-120**, adjust[3] the output signal level and/or cable compensation equalization level, if required.
6. If necessary, set the H SYNC and V SYNC switches[4], on the undersides of the units.

1 You can use the WP-110 (not shown in *Figure 6*) instead of the PT-110. For details, see section 5.1

2 For distances of up to 100 meters you can connect a power adapter to either the PT-110 or TP-120. Above it, both sides should be fed with power

3 Use a screwdriver to carefully rotate the trimmer, adjusting the appropriate level

4 By default, both switches are set for normal H SYNC and V SYNC polarity

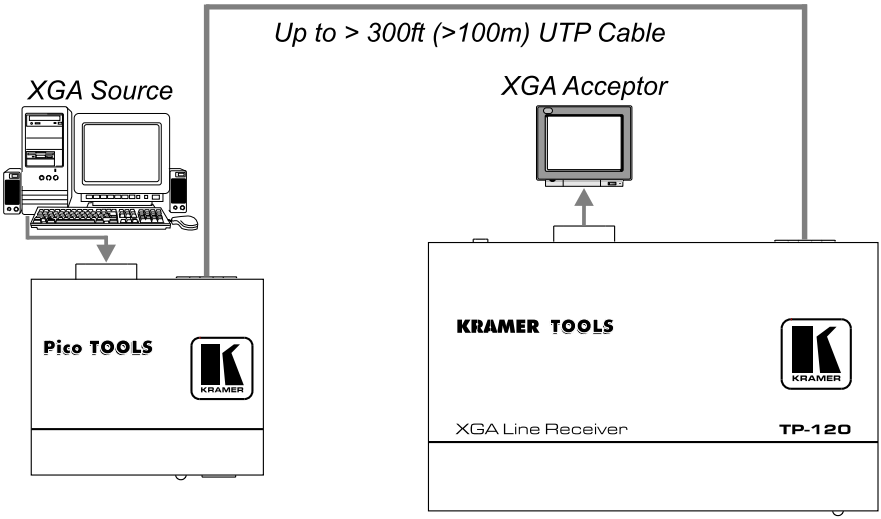


Figure 6: XGA-to-Twisted Pair Transmitter and Receiver System via UTP Cable

5.1 Installing the WP-110 XGA Line Transmitter

To install your **WP-110** *XGA Line Transmitter*:

1. Connect the LINE OUT RJ-45 connector to the pre-installed UTP wiring in the wall box opening that connects via UTP cabling to the LINE IN RJ-45 connector of the **PT-120** or **TP-120**.
2. Connect your 12V DC power supply to the *POWER SUPPLY* pins[1], taking care that **polarity is correct**.
3. Insert the **WP-110** directly into the wall box opening, and then mount the front panel securely using the screws.
4. Connect the XGA source to the *XGA IN* HD15F connector.

1 Connect the wire labeled "+" to the +12V pin, and the wire labeled "–" to the GND pin

5.2 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

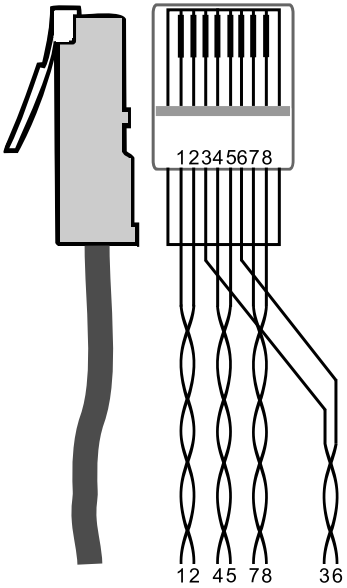
Table 6 and *Figure 7* define the CAT 5 PINOUT, using a straight pin to pin cable with RJ-45 connectors:

Table 6: CAT 5 PINOUT

EIA /TIA 568A	
PIN	**Wire Color**
1	Green / White
2	Green
3	Orange / White
4	Blue
5	Blue / White
6	Orange
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	3 and 6
Pair 3	1 and 2
Pair 4	7 and 8

EIA /TIA 568B	
PIN	**Wire Color**
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6
Pair 4	7 and 8

Figure 7: CAT 5 PINOUT



6 Technical Specifications

Table 7 lists the technical specifications:

Table 7: Technical Specifications[1] of the PT-110 / WP-110 / PT-120 / TP-120

	PT-110	WP-110	PT-120	TP-120
INPUTS:	1 VGA / UXGA on an HD15 connector	1 VGA / UXGA on an HD15 connector	1 RJ-45 LINE IN connector	1 RJ-45 LINE IN connector
OUTPUTS:	1 RJ-45 LINE OUTPUT connector	1 RJ-45 LINE OUT connector	1 VGA / UXGA on an HD15 connector	1 VGA / UXGA on an HD15 connector
MAX. OUTPUT LEVEL:			1.5Vpp	1.4Vpp
RESOLUTION:	Up to UXGA			
DIFF. GAIN[2]:	2.9% (worst case)			
DIFF. PHASE[2]	0.3 Deg (worst case)			
K-FACTOR[2]:	<0.05%			
S/N RATIO[2]:	69dB (worst case)			
CONTROLS:			–7.7dB to +3.1dB, 130m level, 0dB to +25dB EQ. @ 50MHz	–7.5dB to +4.4dB, 130m level, 0dB to +33dBm 130m, EQ. @ 50MHz
COUPLING:	AC	AC	DC	AC
POWERSOURCE:	12 VDC 60mA	12 VDC 60mA	12 VDC 175mA	12 VDC 160mA
DIMENSIONS:	6cm x 6.5cm x 2.5cm (2.36" x 2.56" x 1", W, D, H)	USA: 6.9cm x 3.8cm x 11.4cm (2.72" x 1.5" x 4.5", W, D, H) Belgium and Germany: 8cm x 3.8cm x 8cm (3.15" x 1.5" x 3.15", W, D, H) UK and most of Europe[3]: 8.6cm x 3.8cm x 8.6cm (3.39" x 1.5" x 3.39", W, D, H)	6cm x 6.5cm x 2.5cm (2.36" x 2.56" x 1", W, D, H)	12cm x 7.5cm x 2.5cm (4.7" x 0.98" x 2.95", W, D, H)
WEIGHT:	0.14 kg. (0.31 lbs.) approx.	0.14 kg. (0.31 lbs.) approx.	0.14 kg. (0.31 lbs.) approx.	0.3kg. (0.66lbs.) approx.
ACCESSORIES:	Power supply			
OPTIONS:	19-inch rack adapters			

1 Specifications are subject to change without notice

2 For the Transmitter/Receiver pair

3 Excluding Belgium and Germany

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: “Radio frequency devices Subpart B Unintentional radiators”

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000085 REV 6